	A Shift in the Relative Production of Functional Feeding Groups on River Channel Snags
Expectation:	Passive filtering-collectors will account for 30 - 80% of annual snag-dwelling macroinvertebrate production. Scrapers and shredders will each account for < 5% of annual snag-dwelling macroinvertebrate production.
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Relevant Endpoint(s):	Restoration – Biological Integrity - Community Structure Restoration – Biological Integrity - Food Web Structure
Baseline Condition:	Secondary production of snag-dwelling macroinvertebrates was calculated annually over a two-year period (August 1995 – May 1997) in Pools A and C. Annual production of macroinvertebrates on snags was 41.9 and 32.9 $g/m^2/yr$ for year 1 and 2, respectively, in Pool A, and 28.8 and 70.6 $g/m^2/yr$ for year 1 and 2, respectively, in Pool C. Within Pool A, shredders accounted for 62.6% and 6.5% of total production in year 1 and 2, respectively, followed by gathering-collectors (14.2% and 37.1%, respectively), predators (13.0% and 28.2%, respectively), scrapers (8.0% and 26.6%, respectively), passive filtering-collectors (2.1% and 1.5%, respectively), and vascular plant piercers (0.03% and 0.06%, respectively). Within Pool C, shredders accounted for 34.5% and 58.5% of total production in year 1 and 2, respectively, followed by predators (26.3% and 18.8%, respectively), gathering-collectors (25.8% and 12.9%, respectively), scrapers (8.8% and 8.9%, respectively), passive filtering-collectors (4.6% and 0.8%, respectively), and vascular plant piercers (0.03% and 0.03%, respectively).
Reference Condition:	Historical data on relative production of functional feeding groups of snag-dwelling macroinvertebrates of the Kissimmee River are not available. Reference conditions have been derived from limited published data on functional feeding group composition and annual production of snag-dwelling invertebrates in two southeastern Coastal Plain river-floodplain systems; the Satilla River (Georgia), a sixth-order blackwater river with similar physical, chemical, and hydrologic patterns as the historic Kissimmee River, and Cedar Creek (South Carolina), a second-order blackwater stream (Benke et al. 1984; Smock et al. 1985). Although species composition on snags may differ between systems, similar physical and chemical characteristics should result in similar patterns of invertebrate abundance, standing stock biomass, production, and functional feeding group composition within similar habitats; however, year-to-year variability between sites within the same system can be significant. Table 1 summarizes snag-dwelling macroinvertebrate production of functional feeding groups for several southeastern Coastal Plain rivers. The expected annual production of functional feeding groups in the restored Kissimmee River is a conservative estimate based on the range of values reported for each functional feeding group in the Satilla River and Cedar Creek.

Mechanism Relating Restoration to Reference Conditions:	Continuous, variable flow within reconnected river channels will be the impetus for colonization, persistence, and productivity of snag-dwelling passive filtering-collectors. Because most passive filtering-collectors are sedentary and have evolved various sieving mechanisms for removing particulate matter from suspension, continuous flows are necessary to transport fine particulate organic matter that can be captured and used as a food source. The potential for high standing stock biomass of several filtering-collector taxa (primarily Trichoptera) and rapid biomass turnover rates for others (primarily Simuliidae and filtering chironomids) likely will result in the greatest proportion of total annual production being attributed to filtering-collectors. A decrease in the proportion of production attributed to shredders will result as the primary snag-dwelling shredder within the channelized system, *Glyptotendipes* sp., is replaced by non-shredder taxa that are more indicative of flowing water systems.
Time Course for Restoration:	Because macroinvertebrate filtering-collectors are uncommon within the channelized system, redistribution of production among functional feeding groups is primarily dependent on colonization by filtering-collectors and displacement of existing dominant functional feeding groups. However, the time frame for achieving the stated expectation will depend on distance colonists must travel. Small and large-bodied filtering-collectors, primarily chironomids, simuliids, and caddisflies will likely colonize within 12 –18 months and immigrate from lotic systems within the Kissimmee basin (e.g., Fisheating Creek, Tiger Creek, Cypress Creek, Weohykapka Creek). Most gathering-collectors, primarily chironomids and mayflies, predators, scrapers, and shredders likely to occur on woody debris within reconnected river channels exist within the Kissimmee-Okeechobee ecosystem. A shift in distribution of production among functional feeding groups on existing woody debris is expected to occur within 1-2 years following reestablished continuous flow.
Adjustments for External Constraints:	None
Means of Evaluation:	Sampling of existing snag habitat likely will commence within three months following initiation of the interim upper basin regulation schedule (November 2001) and reestablishment of continuous flow through reconnected river channels. Post-construction sampling methods will be similar to those outlined in Anderson et al. (1998), and include collection of monthly, replicate (5, minimally) snag samples from randomly selected locations within reconnected channels of Pool C and remnant channels of Pool A. Samples will be analyzed for invertebrate species identity, functional feeding group composition, mean annual density, and mean standing stock biomass. Production will be calculated using the instantaneous growth rate (IGR) method. Growth equations for taxa not currently occurring within the Kissimmee River will be obtained from the literature (e.g., Benke et al. 1999). Results will be compared to the stated expectation.

REFERENCES

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Table 1: Percent of total annual production attributed to functional feeding groups for snag-dwelling macroinvertebrates of several southeastern Coastal Plain rivers.

River System	Functional Group	% of Total P ($g/m^2/yr$)		Reference
Channelized Kissimmee River, FL	Filtering-collectors –	Year 1	Year 2	Anderson et al. 1998
	Pool A	2.1	1.5	
	Pool C	4.6	0.8	
	Gathering-collectors –			
	Pool A	14.2	37.1	
	Pool C	25.8	12.9	
	Predators –			
	Pool A	13.0	28.2	
	Pool C	26.3	18.8	
	Scrapers –			
	Pool A	8.0	26.6	
	Pool C	8.8	8.9	
	Shredders –			
	Pool A	62.6	6.5	
	Pool C	34.5	58.5	
	Plant Piercers –			
	Pool A	0.03	0.06	
	Pool C	0.03	0.03	
Satilla River, GA	Filtering-collectors –			Benke et al. 1984
	Upper Site	79.3		
	Lower Site	72.1		
	Gathering-collectors			
	Upper Site	9.7		
	Lower Site	15.7		
	Predators –			
	Upper Site	10.9		
	Lower Site	12.2		
Cedar Creek, SC	Filtering-collector -			Smock et al. 1985
	Upstream Site	58.5		
	Downstream Site	33.6		
	Gathering-collector –			
	Upstream Site	22.8		
	Downstream Site	47.2		
	Predators –			
	Upstream Site	17.8		
	Downstream Site	14.5		
	Scrapers –			
	Upstream Site	< 1		
	Downstream Site	< 1		
	Shredders –			
	Upstream Site	< 1		
	Downstream Site	4.3		